Geometry Date______ Unit 2 Review: Reasoning and Proof

1. What is your name?

2.1 CONDITIONAL STATEMENTS

Examples on pp. 71–74

EXAMPLES

If-then form	If a person is 2 meters tall, then he or she is 6.56 feet tall.
Inverse	If a person is not 2 meters tall, then he or she is not 6.56 feet tall.
Converse	If a person is 6.56 feet tall, then he or she is 2 meters tall.
Contrapositive	If a person is not 6.56 feet tall, then he or she is not 2 meters tall.

Write the statement in if-then form. Determine the hypothesis and conclusion, and write the inverse, converse, and contrapositive.

2. I prepare dinner on Wednesday nights.

Conditional: Hypothesis: Conclusion:

Inverse: Converse: Contrapositive:

Fill in the blank. Then draw a sketch that illustrates your answer.

3. Through any three noncollinear points there exists ___?____ plane.

4. A line contains at least ___?____ points.

2.2 DEFINITIONS AND BICONDITIONAL STATEMENTS

Examples on pp. 79–81

EXAMPLE The statement "If a number ends in 0, then the number is divisible by 10," and its converse "If a number is divisible by 10, then the number ends in 0," are both true. This means that the statement can be written as the true biconditional statement, "A number is divisible by 10 if and only if it ends in 0."

Can the statement be written as a true biconditional statement?

5. If x = 5, then $x^2 = 25$.

6. A rectangle is a square if it has four congruent sides.

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2.3 DEDUCTIVE REASONING

Examples on pp. 87–90

EXAMPLES Using symbolic notation, let p be "it is summer" and let q be "school is closed."

Statement	$p \to q$	If it is summer, then school is closed.
Inverse	$\sim p \to \sim q$	If it is not summer, then school is not closed.
Converse	$q \to p$	If the school is closed, then it is summer.
Contrapositive	$\sim q \to \sim p$	If school is not closed, then it is not summer.

Write the symbolic statement in words using *p* and *q* given below.

p: $\measuredangle A$ is a right angle. q: $m\measuredangle A = 90°$

7. $q \to p$ **8.** $\sim q \to \sim p$ **9.** ~p

Use the Law of Syllogism to write the statement that follows from the pair of true statements.

10. If there is a nice breeze, then the mast is up.
If the mast is up, then we will sail to Dunkirk.

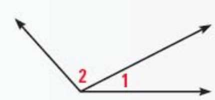
11. If Chess Club meets today, then it is Thursday.
If it is Thursday, then the garbage needs to be taken out.

2.4 REASONING WITH PROPERTIES FROM ALGEBRA

Examples on pp. 96–98

EXAMPLE In the diagram, $m\angle 1 + m\angle 2 = 132°$ and $m\angle 2 = 105°$. The argument shows that $m\angle 1 = 27°$.

$m\angle 1 + m\angle 2 = 132°$	Given
$m\angle 2 = 105°$	Given
$m\angle 1 + 105° = 132°$	Substitution property of equality
$m\angle 1 = 27°$	Subtraction property of equality



Match the statement with the property.

	Statement		Property
12. _____	If $m\measuredangle S = 45°$, then $m\measuredangle S + 45° = 90°$.		A. Symmetric property of equality
13. _____	If UV = VW, then VW = UV.		B. Multiplication property of equality.
14. _____	If AE = EG and EG = JK, then AE = JK.		C. Addition property of equality.
15. _____	If $m\measuredangle K = 9°$, then $3(m\measuredangle K) = 27°$.		D. Transitive Property of Equality.

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Perform a two column proof to solve each equation.

16. $8t - 4 = 5t + 8$

17. $23 + 11d - 2c = 12 - 2c$

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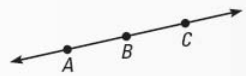
2.5 PROVING STATEMENTS ABOUT SEGMENTS

Examples on pp. 102–104

EXAMPLE A proof that shows $AC = 2 \cdot BC$ is shown below.

GIVEN ▶ $AB = BC$

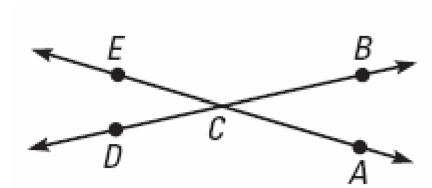
PROVE ▶ $AC = 2 \cdot BC$



Statements	Reasons
1. $AB = BC$	**1.** Given
2. $AC = AB + BC$	**2.** Segment Addition Postulate
3. $AC = BC + BC$	**3.** Substitution property of equality
4. $AC = 2 \cdot BC$	**4.** Distributive property

18. Given: $\overline{AE} \cong \overline{BD}, \overline{CD} \cong \overline{CE}$

Prove: $\overline{AC} \cong \overline{BC}$



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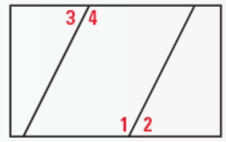
2.6 PROVING STATEMENTS ABOUT ANGLES

Examples on pp. 109–112

EXAMPLE A proof that shows $\angle 2 \cong \angle 3$ is shown below.

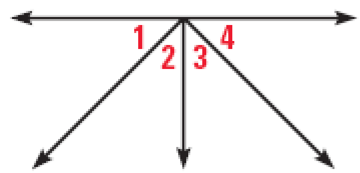


GIVEN ▶ $\angle 1$ and $\angle 2$ form a linear pair,
$\angle 3$ and $\angle 4$ form a linear pair,
$\angle 1 \cong \angle 4$

PROVE ▶ $\angle 2 \cong \angle 3$

Statements	Reasons
1. $\angle 1$ and $\angle 2$ form a linear pair, $\angle 3$ and $\angle 4$ form a linear pair, $\angle 1 \cong \angle 4$	**1.** Given
2. $\angle 1$ and $\angle 2$ are supplementary, $\angle 3$ and $\angle 4$ are supplementary	**2.** Linear Pair Postulate
3. $\angle 2 \cong \angle 3$	**3.** Congruent Supplements Theorem

19. Given: $\measuredangle 1$ & $\measuredangle 2$ are complementary.
$\measuredangle 3$ & $\measuredangle 4$ are complementary.
$\measuredangle 1 \cong \measuredangle 3$



Prove: $\measuredangle 2 \cong \measuredangle 4$